



## **Loading and Managing System Images Configuration Guide, Cisco IOS Release 15SY**

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <http://www.cisco.com/go/trademarks>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

© 2014 Cisco Systems, Inc. All rights reserved.



## CONTENTS

---

### CHAPTER 1

#### Warm Reload 1

- Finding Feature Information 1
- Restrictions for Warm Reload 2
- Information About Warm Reload 2
  - Benefits of Warm Reload 2
  - Warm Reload Functionality 2
- How to Use Warm Reload 3
  - Configuring a Warm Reload 3
  - Reloading Your System Without Overriding the Warm-Reload Functionality 4
- Configuration Examples for Cisco IOS Warm Reload 5
  - Warm Reload Configuration Example 5
- Additional References 5
- Glossary 6
- Feature Information for Warm Reload 6

---

### CHAPTER 2

#### Using FTP to Manage System Images 9

- Finding Feature Information 9
- Image Copying from Flash Memory to an FTP Server 9
- Image Copy from an FTP Server to a Flash Memory File System 10
  - FTP Username and Password 10
- Copying an Image from Flash Memory to an FTP Server 11
  - Examples 12
- Copying from an FTP Server to Flash Memory 12
  - Examples 14





# CHAPTER 1

## Warm Reload

The Warm Reload feature allows users to reload their routers without reading images from storage. That is, the Cisco IOS image reboots without ROM monitor mode (ROMMON) intervention by restoring the read-write data from a previously saved copy in the RAM and by starting execution without either copying the image from flash to RAM or self-decompression of the image. Thus, the overall availability of your system improves because the time to reboot your router is significantly reduced.

### Finding Feature Information in This Module

*Your Cisco IOS software release may not support all of the features documented in this module.* To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the [Feature Information for Warm Reload](#).

### Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required..

- [Finding Feature Information, page 1](#)
- [Restrictions for Warm Reload, page 2](#)
- [Information About Warm Reload, page 2](#)
- [How to Use Warm Reload, page 3](#)
- [Configuration Examples for Cisco IOS Warm Reload, page 5](#)
- [Additional References, page 5](#)
- [Glossary, page 6](#)
- [Feature Information for Warm Reload, page 6](#)

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To

find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Restrictions for Warm Reload

### Additional Memory Consumption

Additional memory is consumed because a copy of the initialized variables must be stored for a warm reboot to function. However, to consume as little memory as possible, a copy of the initialized variables is kept in a compressed form, which is marked as “read-only” to prevent corruption.

### Software Support Only

A warm reboot should be used only for forced software crashes. Hardware failure of any kind will result in a cold reboot.

## Information About Warm Reload

### Benefits of Warm Reload

#### Quicker Router Reload

By eliminating the need to copy an image from flash to RAM and decompress it, the reload time of a router is reduced by 2 to four minutes. The time savings is greater on platforms that use the BOOTLDR images because the additional step of loading a BOOTLDR image and parsing the configuration file by the BOOTLDR image can be avoided.

#### Flash Card Removal

The router is not useless if a flash card is removed because it can still reboot as long as it is not forced into a cold reboot (such as a power failure).

## Warm Reload Functionality

When encountering a crash, a Cisco IOS image transfers control to ROMMON, which copies the system image from the storage device (which is typically flash) to main memory, decompresses the system image, and transfers control back to Cisco IOS. Warm rebooting allows the image to return to the start of the text segment in memory and restart execution from that point, thereby, eliminating ROMMON intervention. A copy of the initialized variables is kept in memory and is used to overwrite the existing memory location where the initialized variables are stored. Thus, when the CPU returns to the start of the text segment and begins operating, the information is the same as if execution had begun after the binary had been read from flash and decompressed.

# How to Use Warm Reload

## Configuring a Warm Reload

Use this task to configure your router for a warm reload in global configuration mode.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **warm-reboot** [*countnumber*] [*up timeminutes*]
4. **exit**
5. **show warm-reboot**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>warm-reboot</b> [ <i>countnumber</i> ] [ <i>up timeminutes</i> ]  <b>Example:</b> Router(config)# warm-reboot count 10 uptime 10	Enables a router to warm-reboot.  <ul style="list-style-type: none"> <li>• <b>count</b> <i>number</i> --Maximum number of warm reboots allowed between any intervening cold reboot. Valid values range from 1 to 50. The default value is 5 times.</li> <li>• <b>uptime</b> <i>minutes</i> --Minimum number of minutes that must elapse between initial system configuration and an exception before a warm reboot is attempted. If the system crashes before the specified time elapses, a warm reboot is not attempted. Valid values range from 0 to 120. The default value is 5 minutes.</li> </ul> <p><b>Note</b> After a warm reboot is enabled, it will not become active until after the next cold reboot because a warm reboot requires a copy of the initialized memory.</p>
<b>Step 4</b>	<b>exit</b>	Exits global configuration mode and return to EXEC mode.

	Command or Action	Purpose
<b>Step 5</b>	<b>show warm-reboot</b>  <b>Example:</b> Router# show warm-reboot	(Optional) Displays statistics for attempted warm reboots.

## Reloading Your System Without Overriding the Warm-Reload Functionality

If you issue the **reload** command after you have configured the **warm-reboot** global command, a cold reboot will occur. Thus, if you wish to reload your system, but do not want to override the warm-reboot functionality, you should specify the **warm** keyword with the **reload** command. Use this task to configure your router for a warm reboot while you reload your system.

### SUMMARY STEPS

1. **enable**
2. **reload** **[[warm] text | [warm] in [hh:mm [text] | [warm] at hh:mm [monthday | daymonth] [text] | [warm] cancel**
3. **show reload**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>reload</b> <b>[[warm] text   [warm] in [hh:mm [text]   [warm] at hh:mm [monthday   daymonth] [text]   [warm] cancel</b>  <b>Example:</b> Router# reload warm at 10:30	Reloads the operating system.  You must issue the <b>warm</b> keyword if you do not want to override the warm reboot functionality when you reload the router.
<b>Step 3</b>	<b>show reload</b>  <b>Example:</b> Router# show reload	Displays the reload status on the router.



# Configuration Examples for Cisco IOS Warm Reload

## Warm Reload Configuration Example

The following example shows how to enable and verify a warm reboot:

```
Router#(config) warm-reboot count 10 uptime 10
Router#(config) exit
!
Router# show warm-reboot
Warm Reboot is enabled
Statistics:
10 warm reboots have taken place since the last cold reboot
XXX KB taken up by warm reboot storage
```

## Additional References

The following sections provide references related to the Warm Reload feature.

### Related Documents

Related Topic	Document Title
Additional information on rebooting your router	Rebooting and Reloading - Configuring Image Loading Characteristics
Additional booting commands	Cisco IOS Configuration Fundamentals Command Reference

### Standards

Standards	Title
None	--

### MIBs

MIBs	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

RFCs	Title
None	--

**Technical Assistance**

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	<a href="http://www.cisco.com/public/support/tac/home.shtml">http://www.cisco.com/public/support/tac/home.shtml</a>

## Glossary

**cold reboot** --Process of reloading a Cisco IOS image in which the ROMMON copies the configured image from a storage device, such as flash, into main memory. Thereafter, the image is decompressed and execution is started.

**warm reboot** --Process of reloading a Cisco IOS image without ROMMON intervention in which the image restores read-write data from a previously saved copy in the RAM and starts execution. Unlike a cold reboot, this process does not involve a flash to RAM copy or self-decompression of the image.

**Note**

Refer to [Networking Terms and Acronyms](#) for terms not included in this glossary.

## Feature Information for Warm Reload

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for Warm Reload**

Feature Name	Releases	Feature Information
Warm Reload	12.3(2)T 12.2(18)S 12.2(27)SBC	<p>The Warm Reload feature allows users to reload their routers without reading images from storage.</p> <p>The following sections provide information about this feature:</p> <ul style="list-style-type: none"><li>• Information About Warm Reload</li><li>• How to Use Warm Reload</li></ul>





## Using FTP to Manage System Images

This module contains information about using FTP to manage Cisco system images.

- [Finding Feature Information, page 9](#)
- [Image Copying from Flash Memory to an FTP Server, page 9](#)
- [Image Copy from an FTP Server to a Flash Memory File System, page 10](#)
- [Copying an Image from Flash Memory to an FTP Server, page 11](#)
- [Copying from an FTP Server to Flash Memory, page 12](#)

### Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

### Image Copying from Flash Memory to an FTP Server

The FTP protocol requires a client to send a remote username and password on each FTP request to a server. When you copy a configuration file from the router to a server using FTP, the Cisco IOS software sends the first valid username it encounters in the following list:

- 1 The username specified in the **copy** privileged EXEC command, if a username is specified.
- 2 The username set by the **ipftpusername** global configuration command, if the command is configured.
- 3 Anonymous.

The router sends the first valid password it encounters in the following list:

- 1 The password specified in the **copy** privileged EXEC command, if a password is specified.

- 2 The password set by the **ipftppassword** global configuration command, if the command is configured.

The router forms a password *username @routername .domain* . The variable *username* is the username associated with the current session, *routername* is the configured hostname, and *domain* is the domain of the router.

The username and password must be associated with an account on the FTP server. If you are writing to the server, the FTP server must be properly configured to accept the FTP write request from the user on the router.

If the server has a directory structure, the configuration file or image is written to or copied from the directory associated with the username on the server. For example, if the system image resides in the home directory of a user on the server, specify that user's name as the remote username.

Refer to the documentation for your FTP server for more information.

Use the **ipftpusername** and **ipftppassword** commands to specify a username and password for all copies. Include the username in the **copy** command if you want to specify a username for that copy operation only.

## Image Copy from an FTP Server to a Flash Memory File System

You can copy a system image from an FTP server to a flash memory file system.

### FTP Username and Password

The FTP protocol requires a client to send a remote username and password on each FTP request to a server. When you copy a configuration file from the router to a server using FTP, the Cisco IOS software sends the first valid username it encounters in the following list:

- 1 The username specified in the **copy** privileged EXEC command, if a username is specified.
- 2 The username set by the **ipftpusername** global configuration command, if the command is configured.
- 3 Anonymous.

The router sends the first valid password it encounters in the following list:

- 1 The password specified in the **copy** privileged EXEC command, if a password is specified.
- 2 The password set by the **ip ftp password** command, if the command is configured.

The router forms a password *username @routername .domain* . The variable *username* is the username associated with the current session, *routername* is the configured host name, and *domain* is the domain of the router.

The username and password must be associated with an account on the FTP server. If you are writing to the server, the FTP server must be properly configured to accept the FTP write request from the user on the router.

If the server has a directory structure, the configuration file or image is written to or copied from the directory associated with the username on the server. For example, if the system image resides in the home directory of a user on the server, specify that user's name as the remote username.

Refer to the documentation for your FTP server for more information.

Use the **ip ftp username** and **ip ftp password** commands to specify a username and password for all copies. Include the username in the **copy** command if you want to specify a username for that copy operation only.

# Copying an Image from Flash Memory to an FTP Server

To copy a system image to an FTP network server, complete the tasks in this section:

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip ftp username** *username*
4. **ip ftp password** *password*
5. **end**
6. **show flash-filesystem :**
7. **copy flash-filesystem : filename ftp:** [[[//[username [:password ]@]location ]/directory ]/filename ]

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	(Optional) Enters global configuration mode. This step is required only if you override the default remote username or password (see Steps 2 and 3).
<b>Step 3</b>	<b>ip ftp username</b> <i>username</i>  <b>Example:</b> Router(config)# ip ftp username user1	(Optional) Changes the default remote username.
<b>Step 4</b>	<b>ip ftp password</b> <i>password</i>  <b>Example:</b> Router(config)# ip ftp password guessme	(Optional) Changes the default password.
<b>Step 5</b>	<b>end</b>  <b>Example:</b> Router(config)# end	(Optional) Exits global configuration mode. This step is required only if you override the default remote username or password (see Steps 2 and 3).

	Command or Action	Purpose
<b>Step 6</b>	<b>show flash-filesystem :</b>  <b>Example:</b> Router# show flash:	(Optional) Displays the system image file in the specified flash directory. If you do not already know it, note the exact spelling of the system image filename in flash memory.
<b>Step 7</b>	<b>copy flash-filesystem : filename ftp: [[[/[username [:password ]@]/location ]/directory ]/filename ]</b>  <b>Example:</b> Router# copy slot0:1:your-ios ftp://myuser:mypass@172.23.1.129/dirt/sysadmin/your-ios	Copies the image to the FTP server.  <b>Note</b> After you have issued the <b>copy</b> privileged EXEC command, you may be prompted for additional information or for confirmation of the action. The prompting will depend on how much information you provide in the <b>copy</b> command and the current setting of the <b>fileprompt</b> global configuration command.

## Examples

The following example uses the **showslot1:privilegedEXEC** command to display the name of the system image file in the second PCMCIA slot, and copies the file (test) to an FTP server:

```
Router# show slot1:
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time----- name
1  .. 1          46A11866 2036C   4    746      May 16 1995 16:24:37 test
Router# copy slot1:test ftp://thisuser:thatpass@172.16.13.110/test
writing test!!!!...
successful ftp write.
```

In this example, the file named your-ios is copied from partition 1 of the flash memory PC card in slot 0 to the TFTP server at 172.23.1.129. The file will be saved with the name your-ios in the dirt/sysadmin directory relative to the directory of the remote username.

```
Router# show slot0: partition 1
PCMCIA Slot0 flash directory, partition 1:
File Length Name/status
1 1711088 your-ios
[1711152 bytes used, 2483152 available, 4194304 total]
Router# copy slot0:1:your-ios ftp://myuser:mypass@172.23.1.129/dirt/sysadmin/your-ios
Verifying checksum for 'your-ios' (file # 1)... OK
Copy 'your-ios' from Flash to server
as 'dirt/sysadmin/ios-2'? [yes/no] yes
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Upload to server done
Flash device copy took 00:00:23 [hh:mm:ss]
```

## Copying from an FTP Server to Flash Memory

To copy a system image from an FTP server to a flash memory file system, complete the tasks in this section:



## SUMMARY STEPS

1. **enable**
2. **show flash-filesystem :**
3. **copy flash-url tftp :[[[//location ]/directory ]/filename ]**
4. **configure terminal**
5. **ip ftp username username**
6. **ip ftp password password**
7. **end**
8. **copy ftp: [[[/[username [:password ]@]location ]/directory ]/filename ]flash-filesystem:[filename ]**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>show flash-filesystem :</b>  <b>Example:</b> Router# show flash:	(Optional) Displays the system image filename in Flash memory. Use this command to verify the url-path of the file and the exact spelling of the system image filename for use in the next command.
<b>Step 3</b>	<b>copy flash-url tftp :[[[//location ]/directory ]/filename ]</b>  <b>Example:</b> Router# copy slot0:1:your-ios tftp://172.23.1.129/dirt/sysadmin/your-ios	Copies the system image from Flash memory to a TFTP server. Specify the file location and filename as the <i>flash-url</i> argument.  <b>Note</b> After you have issued the <b>copy</b> privileged EXEC command, you may be prompted for additional information or for confirmation of the action. The prompting will depend on how much information you provide in the <b>copy</b> command and the current setting of the <b>fileprompt</b> global configuration command.
<b>Step 4</b>	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	(Optional) Enters global configuration mode from the terminal. This step is required only if you want to override the default remote username or password (see Steps 3 and 4).
<b>Step 5</b>	<b>ip ftp username username</b>  <b>Example:</b> Router(config)# ip ftp username netuser1	(Optional) Changes the default remote username.

	Command or Action	Purpose
<b>Step 6</b>	<b>ip ftp password</b> <i>password</i>  <b>Example:</b> Router(config)# ip ftp password guessme	(Optional) Changes the default password.
<b>Step 7</b>	<b>end</b>  <b>Example:</b> Router(config)# end	(Optional) Exits global configuration mode. This step is required only if you override the default remote username or password (see Steps 3 and 4).
<b>Step 8</b>	<b>copy ftp:</b> [[[/[ <i>username</i> [: <i>password</i> ]@] <i>location</i> ] / <i>directory</i> ]/ <i>filename</i> ] <i>flash-filesystem</i> :[ <i>filename</i> ]  <b>Example:</b> Router# copy ftp://myuser:mypass@theserver/tftpboot/sub3/c7200-js-mz slot1:c7200-js-mz	Copies the configuration file from a network server to running memory or the startup configuration using rcp.  <b>Note</b> After you have issued the <b>copy</b> privileged EXEC command, you may be prompted for additional information or for confirmation of the action. The prompting will depend on how much information you provide in the <b>copy</b> command and the current setting of the <b>fileprompt</b> global configuration command.

## Examples

The following example illustrates how to use the **reload** command to reload the software on the router on the current day at 7:30 p.m.:

```
Router# reload at 19:30
Reload scheduled for 19:30:00 UTC Wed Jun 5 1996 (in 2 hours and 25 minutes)
Proceed with reload? [confirm]
```

The following example illustrates how to use the **reload** command to reload the software on the router at a future time:

```
Router# reload at 02:00 jun 20
Reload scheduled for 02:00:00 UTC Thu Jun 20 1996 (in 344 hours and 53 minutes)
Proceed with reload? [confirm]
```